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PATENT APPLICATION

NOV 14 2002

RESPONSE UNDER 37 CFR §1.116

EXPEDITED PROCEDURE

Technology Center 2100

TECHNOLOGY CENTER ART UNIT 2123

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Richard M. WASSERMAN

Group Art Unit: 2123

Application No.: 09/243,689

Examiner: E. Garcia-Otero

Filed: February 3, 1999

Docket No.: 101473

For: **HARDWARE VISION SIMULATION SYSTEMS AND METHODS FOR VISION
INSPECTION SYSTEMS**

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

Director of the U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

In reply to the Final Office Action mailed May 24, 2002, the period of reply extended to October 24, 2002, reconsideration of the rejections and objections is respectfully requested in light of the following remarks.

Claims 1-11, 13-18, 20-27 and 29-44 are pending.

Applicant appreciates the courtesies extended to Applicant's representatives by Examiners Garcia-Otero, Jones and Frejd in the August 6, 2002, personal interview. The points discussed are incorporated into the following remarks.

The Office Action, at page 3, requests that Applicant provide a copy of OpenGL Reference Manual. As pointed out during the August 6 Personal Interview, a copy of the OpenGL Reference Manual can be found online at "www.opengl.org."

The Office Action, at pages 3 and 4, indicates that two publications referenced in the application, OpenGL Reference Manual and A Lens and Aperture Camera Model for Synthetic Image Generation are not incorporated by reference. Applicant included these references believing that the included knowledge was and is generally known and available to one skilled in the art related to the applicants invention. Therefore, applicant submits that the paper A Lens and Aperture Camera Model for Synthetic Image Generation is referenced only as an exemplary source suitable for directing attention of one skilled in the art to the scope and type of example lens effects processing engines that may be used with the claimed invention and was not intended as an incorporation by reference. Similarly, applicant submits that the OpenGL Reference Manual is provided only as an exemplary source suitable for directing attention of one skilled in the art to the scope and type of rendering engines that may be used with the claimed invention and was not intended as an incorporation by reference.

I. THE DRAWINGS SATISFY ALL FORMAL REQUIREMENTS

The Office Action objects to the drawings for various informalities. Specifically, the Office Action, at pages 2 and 3, objects to the drawings as using reference characters improperly. Applicant respectfully submits that the drawings satisfy all formal requirements.

As pointed out during the August 6 Personal Interview, Fig. 1 shows an exemplary embodiment of a physical vision inspection system (see specification, at page 3, lines 26-27), while Fig. 2 shows an exemplary embodiment of a vision simulation system (see specification, at page 4, line 21). Figs. 1 and 2 relate to different types of systems, and thus the components in each system are designated with a different reference character.

For at least these reasons, Applicant respectfully requests that the objection to the drawings be withdrawn.

II. THE CLAIMS DEFINE ALLOWABLE SUBJECT MATTER

The Office Action rejects claims 1, 2, 10, 11 and 22 under 35 U.S.C. §103(a) as being unpatentable over "A Realistic Camera Model for Computer Graphics" by Kolb et al. (hereinafter "Kolb") in view of U.S. Patent 5,137,450 to Thomas (hereinafter "Thomas") or alternatively in view of U.S. Patent 6,196,845 to Streid (hereinafter "Streid"); rejects claims 3-6, 8-9, 13-18, 20-21, 23-27, and 29-44 under 35 U.S.C. §103(a) as being unpatentable over Kolb in view of Thomas (or alternatively in view of Streid) and further in view of U.S. Patent 6,064,759 to Buckley et al. (hereinafter "Buckley"); and rejects claim 7 under 35 U.S.C. §103(a) as being unpatentable over Kolb in view of Thomas (or alternatively in view of Streid) and further in view of "Modeling optical vision systems with innovative software" to Stevenson et al. (hereinafter "Stevenson"). These rejections are respectfully traversed.

Kolb discloses a physically-based camera model for use in computer graphics (see Kolb, page 318, first column, first paragraph). Kolb, as disclosed at pages 318-320, is directed only at simulating a lens system for use in computer graphics.

Kolb fails to disclose, teach or suggest a second model representing at least an optical system corresponding to a machine vision system being simulated, as recited in independent claims 1 and 22, or of the similar features set forth in claims 37 and 41.

The Office Action, at page 5, item 19, asserts that Kolb, at page 317, second column, third bullet and at page 318, first paragraph, discloses this feature. However, as pointed out during the August 6 Personal Interview, Kolb, in its Introduction section, merely states that accurate camera models are important in many situations, including in some machine systems and scientific applications. Kolb is directed at, and discusses in detail, the use of a camera lens model in computer graphics.

Further, Kolb, as admitted by the Office Action, fails to disclose a user interface representative of a user interface of the machine vision system being simulated, as claimed in independent claims 1, 22, or of the similar features set forth in independent claims 37 and 41.

The Office Action, in items 22 and 23 (pages 4 and 5), asserts that this feature is disclosed by either Thomas or by Streid. Specifically, the Office Action asserts that Thomas, at col. 5, lines 39-40, discloses "window 1 includes a simulated heads-up display to complete the simulation for a typical tactical fighter." The Office Action further asserts that "the fighter heads-up displays typically include icons indicating positions of other fighters and the position of the horizon which are acquired by radar, and that the radar is a machine vision system." The Office Action asserts that "the simulated heads-up display is a user interface representative of a user interface of the machine vision system being simulated (fighter radar system)." Applicant respectfully disagrees with the Office Action's assertion.

First, Thomas does not explicitly disclose a radar or like system anywhere in its specification. Nor does Thomas explicitly disclose icons indicating positions of other fighters and the position of the horizon which are acquired by radar. Thus, the Office Action's assertion that "the fighter heads-up displays typically include icons indicating positions of other fighters and the position of the horizon which are acquired by radar, and that the radar is a machine vision system" is misguided.

Further, as pointed out during the August 6 Personal Interview, Applicant respectfully submits that a radar is **not** equivalent to the machine vision system being simulated, as claimed in claims 1-11, 13-18, 20-27 and 29-44.

Thomas is simply directed at a flight simulation system. Thomas, at Abstract, col. 1, lines 13-16, col. 2, lines 45-58, col. 3 lines 24-26, col. 4, line 47 to col. 6, line 49, and in Figs. 1-6, discloses the physical recreation of a cockpit of a plane and the displays associated with flying a plane. In Thomas, video images previously recorded are projected by projectors onto

several screens around the pilot(s) so as to display out-the-window views that the pilot(s) would observe from the cockpit of the plane. The pilot in Thomas is fitted with a helmet having a magnetic tracker or position indicator that allows the flight simulation system to switch the various video images displayed to the pilot according to where the pilot's head and eyes are pointing at a particular moment.

Because Thomas does not simulate a machine vision system, Thomas cannot disclose, teach or suggest a user interface representative of a user interface of the machine vision system being simulated, as claimed in independent claims 1, 22, 37 and 41.

Further, Streid does not make up for the deficiency of Kolb or Thomas.

The Office Action asserts that Streid discloses the feature "a user interface representative of a user interface of the machine vision system being simulated," as claimed in independent claims 1, 22, 37 and 41. Specifically, the Office Action asserts that Streid, at col. 1, lines 49-50, discloses that "Simulation systems provide fully simulated NGV imagery projected onto displays." The Office Action asserts that the NGV (or night vision goggles) are the user interface of the machine vision system (defined as the night vision system). However, as pointed out during the August 6 Personal Interview, the Office Action's interpretation of Streid is incorrect.

Streid is directed to, and discloses an NGV stimulation system and not an NGV simulation system. As disclosed in Streid, at col. 1, lines 51-54, "Stimulation systems, on the other hand [when comparing with simulation systems], use a light generated display to artificially stimulate actual night vision goggles to react as they would in true nighttime operations." Thus, Streid is simply directed to a system for stimulating night vision goggles. In Streid, the stimulated night vision goggles are used to stimulate a scene to be viewed by the goggles across a wide dynamic light intensity range (see Streid, at col. 3, lines 43-46).

Further, Applicant respectfully submits that unlike the Office Action's assertion, night vision goggles (or system) is not at all equivalent to a machine vision system.

Because Streid does not simulate a machine vision system, but only stimulates night vision goggles, Streid cannot disclose, teach or suggest a user interface representative of a user interface of the machine vision system being simulated, as claimed in independent claims 1, 22, 37 and 41.

Furthermore, Buckley fails to make up for the deficiencies of Kolb, Thomas or Streid.

Regarding independent claims 37 and 41, the Office Action, in items 162-168 and 180-187, asserts that Kolb, in combination with either Thomas or Streid and further in combination with Buckley, discloses, teaches or suggests the claimed invention. Applicant respectfully disagrees with these assertions.

As discussed above and pointed out during the August 6 Personal Interview, neither Thomas nor Streid disclose, teach or suggest a user interface representative of a user interface of the machine vision system being simulated, as claimed in independent claims 37 and 41. Therefore, neither Kolb alone or in combination with Thomas or Streid, disclose, teach or suggest rendering a synthetic image of at least one object as viewed through the machine vision system based on a representation of at least one component of the machine vision system, as claimed in claim 37. Moreover, neither Kolb alone or in combination with Thomas or Streid, disclose, teach or suggest providing the synthetic image to a user interface representative of a user interface of the machine vision system, as claimed in claim 37.

Further, Buckley fails to disclose, teach or suggest selecting a machine control instruction based at least in part on the synthetic image, as claimed in claim 37. The Office Action asserts that Buckley, at col. 29, lines 41-43, discloses this feature. However, as pointed out during the August 6 Personal Interview, in Buckley, the object is to efficiently

eliminate image data which is not needed for the purpose of characterizing the shape of an actual part shown in an actual image captured using a real or actual camera system.

In contrast, as claimed in claim 37, a synthetic image of at least one object, as viewed through a machine vision system, is rendered and then provided to a user interface representative of a user interface of the machine vision system. A machine control instruction is then selected based at least in part on the synthetic image. Thus, selecting a machine control instruction based at least in part on the synthetic image, as claimed in claim 37, is different than the step disclosed in Buckley of selecting a machine instruction based at least in part on an actual image of an actual part, as captured by a camera system.

Thus, Applicant respectfully submits that, taken separately or together, Kolb, Thomas, Streid and Buckley do not teach or suggest the present invention as claimed in independent claims 1, 22, 37 and 41.

As required by MPEP Section 706.02(j), to establish a prima facie case of obviousness, these basic criteria must be met:

- 1) There must be some suggestion or motivation in the references themselves or in the knowledge generally available;
- 2) Reasonable expectation of success;
- 3) The prior art reference must teach or suggest all claim limitations.

The first and third requirements have not been met by the rejections of the Office Action.

Neither Kolb nor Thomas, Streid or Buckley show any motivation to modify their structure to achieve the claimed invention, and the Office Action clearly admits that there is an essential part of the claimed invention missing in Kolb.

For at least these reasons, Applicant respectfully submits that Kolb, either alone or in combination with Thomas, Streid or Buckley fails to teach, disclose or suggest all of the features of claims 1-11, 13-18, 20-27 and 29-44. Thus, Kolb, either alone or in combination with Thomas, Streid or Buckley, fails to render obvious the subject matter of claims 1-11, 13-

18, 20-27 and 29-44 under 35 U.S.C. §103(a). Withdrawal of the rejections of claims 1-11, 13-18, 20-27 and 29-44 under 35 U.S.C. §103(a) as unpatentable over Kolb, either alone or in combination with Thomas, Streid or Buckley, is respectfully requested.

III. CONCLUSION

For at least the reasons discussed above, it is respectfully submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of claims 1-11, 13-18, 20-27 and 29-44 is respectfully requested.

Should the Examiner believe that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the Applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,



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SJR:GPS/srh

Attachment:
Petition for Extension of Time

Date: October 22, 2002

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